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64-A19

Examination: BA/BSC Annual Examination 2019

Subject: Physics

Paper: D

Time Allowed: 3 hours

Maximum Marks: 40

Pass Marks: 13

Sr. No.	Note: Attempt any four questions. All questions carry equal marks.	Syllabus
Q:NO:1	a) Define rectification. Explain Half wave and Full wave rectification. b) Calculate the gain of an amplifier in which collector resistance is 5 KΩ and internal resistance between base and emitter is 2.5 KΩ and value of β is 100. c) Why the energy bands in a solid become more wider for higher orbits than that of lower orbits.	(5+3+2)
Q:NO:2	a) What is Compton Effect? Derive relation for Compton Shift. b) A 50 keV photon is Compton scattered by a loosely bounded electron. If the scattered photon comes off at 45^0. What is its wavelength after scattering? c) Differentiate between photoelectric effect and Compton effect?	(5+3+2)
Q:NO:3	a) What is de Broglie hypothesis about wave nature of particles? Give experimental verification by Davission and Germer. b) Find the de Broglie wavelength of an electron whose K.E is 120 ev. c) If neutron and proton are moving with same kinetic energy, which of them has greater de Broglie wavelength?	(5+3+2)
Q:NO:4	a) Write the postulates of quantum mechanics. Derive wave function for a free particle using Schrodinger wave equations. b) Consider an electron trapped in an infinite potential well whose width is 100 pm. If it is in a state with n = 3. What is its energy? c). What is basic difference between classical and quantum physics?	(5+3+2)
Q:NO:5	a) Define Half life and Mean life. Find their relations and show that mean life is greater than half life. b) The half life of a particular radioactivity isotope is 6.5 h. If these are initially 48×10^{19} atoms of this isotopes, how many atoms of this isotope remain after 26 h. c) The half life of uranium is 4.47×10^9 years, about the age of solar system. How can such a half life is measured?	(5+3+2)
Q:NO:6	a) Define Mass defect and Binding energy. Also find their values for $_2He^4$ nucleus. Mass of $_2He^4$ = 4.00281 a.m.u, Mass of Proton = 1.0076 a.m.u, Mass of neutron = 1.00896 a.m.u. b) Explain Beta decay in detail. Also write general and particular equations for process of β-decay.	(5+5)
Q:NO:7	Write note on any two of the following. a) Transistor as an Ostilator. b) Frank Hertz Experiment. c) Fission Chain reaction	(5+5)